pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS POLLUTANT REDUCTION PLAN (PRP) INSTRUCTIONS

The Department of Environmental Protection (DEP) has developed these instructions to assist MS4 applicants and permittees (MS4s) in the preparation of Pollutant Reduction Plans (PRPs) for stormwater discharges of nutrients and sediment to surface waters in the Chesapeake Bay watershed, and for stormwater discharges to local surface waters impaired for nutrients and/or sediment. MS4s identified in DEP's MS4 Requirements Table (available at www.dep.pa.gov/MS4) as needing to comply with Appendix D and/or Appendix E of the PAG-13 General Permit or an individual permit must attach PRP(s) to the NOI for General Permit coverage or application for an individual permit. DEP will not approve permit coverage unless a satisfactory PRP is submitted. These instructions explain how to develop a satisfactory PRP for both Chesapeake Bay (Appendix D) and impaired waters (Appendix E).

NOTE – A PRP is not required and the permittee is not required to follow Appendix D and/or Appendix E in the PAG-13 General Permit or individual permit, as applicable, if 1) the applicant is eligible for a waiver (see Waiver Application Instructions, 3800-PM-BCW0100f) or 2) the applicant is not eligible for a waiver but has completed its mapping of all stormwater outfalls and can demonstrate that both of the following apply:

1. There are no stormwater discharges to the Chesapeake Bay watershed; and

2. There are no stormwater discharges to local surface waters impaired for nutrients and/or sediment.

In the case of option 2), the applicant may submit a map that demonstrates both conditions. The cover letter transmitting the NOI should request a waiver from the requirement to develop a PRP.

I. General Information

A. **Terms**: The term "nutrients" refers to "Total Nitrogen" (TN) and "Total Phosphorus" (TP) unless specifically stated otherwise in DEP's latest Integrated Report. The terms "sediment," "siltation," and "suspended solids" all refer to inorganic solids and are hereinafter referred to as "sediment."

B. **Pollutants of Concern and Required Reductions**: For all PRPs, MS4s shall calculate existing loading of the pollutant(s) of concern, in lbs/year; calculate the minimum reduction in loading, in lbs/year; select BMP(s) to reduce loading; and demonstrate that the selected BMP(s) will achieve the minimum reductions.

For Chesapeake Bay PRPs (Appendix D), the pollutant of concern is sediment and the minimum reduction in loading is 10%. Although Appendix D of the PAG-13 General Permit and individual permit also requires minimum reductions for TN and TP, DEP will consider MS4s to have complied with the TN and TP requirements when sediment is reduced at least 10% compared to existing loading.

For PRPs developed for impaired waters (Appendix E), the pollutant(s) are based on the impairment listing, as provided in the MS4 Requirements Table. If the impairment is based on siltation only, a minimum 10% sediment reduction is required. If the impairment is based on nutrients only or other surrogates for nutrients (e.g., "Excessive Algal Growth" and "Organic Enrichment/Low D.O."), a minimum 5% TP reduction is required. If the impaired is due to both siltation and nutrients, both sediment (10% reduction) and TP (5% reduction) must be addressed.

C. **Existing Pollutant Loading**: Existing loading must be calculated as of a date no earlier than March 16, 2013 (i.e., effective date of 2013 PAG-13 General Permit). If structural BMPs were implemented during the 2013 PAG-13 General Permit term starting on March 16, 2013, MS4s can claim credit for the pollutant reductions associated with those BMPs. If no structural BMPs were implemented since March 16, 2013, the MS4 can use the PRP development date for the determination of existing loading. MS4s may not claim credit for street sweeping and other non-structural BMPs implemented prior to 2018. If post-2013 structural BMPs were implemented as a result of regulatory requirements, the MS4 must demonstrate in the PRP that the BMPs exceeded regulatory requirements in order to claim pollutant reduction credit.

Commented [OE1]: Similar to PAG-13 permit, this language is not acceptable to EPA. Where the instructions seem contrary to actual permit requirements.

Commented [OE2]: Does PADEP have a rationale/basis for choosing this 5% to represent all local nutrient impairments? We know that for the CB this reduction was derived from modeling, but does that make it appropriate to use state-wide? Again, the fact sheet should explain this.

Commented [OE3]: In the email reponse that was provided to EPA, PADEP described the rationale for why only a TP reduction was necessary. That rationale should be added to the fact sheet and/or permit so that there is documentation in the permit documents as to why PADEP is taking this approach.

Commented [OE4]: What is the explanation for using 2013 as the baseline for this permit? Permittees were required to implement plans and BMPS to comply with the 2013 permit. Why are we allowing them to take credit for these BMPs again?

Commented [OE5]: Does this include the regulatory requirement to develop and implement a TMDL Plan and/or PRP in conjunction with the 2013 PAG-13?

D. **BMP Effectiveness**: All MS4s must use the BMP effectiveness values contained within DEP's BMP Effectiveness Values document (3800-PM-BCW0100m) for BMPs listed in that document when determining pollutant load reductions in PRPs. For BMPs not listed in 3800-PM-BCW0100m, MS4s may use effectiveness values from the Chesapeake Assessment Scenario Tool (CAST) (www.casttool.org) or other expert panel reports published by the Chesapeake Bay Program Office.

E. **Combining PRPs**: If an MS4 discharges stormwater to local surface waters that drain to the Chesapeake Bay watershed (Appendix D) that are also impaired for nutrients and/or sediment (Appendix E), separate or combined PRPs may be submitted, at the MS4's discretion.

For MS4s within the Chesapeake Bay watershed who are submitting combined PRPs to address both Appendices D and E, it is recommended that permittees focus on the impaired local surface waters first, and then determine if the Best Management Practices (BMPs) proposed in those storm sewersheds will be sufficient to meet the overall pollutant reduction requirements for the combined storm sewershed for the Chesapeake Bay. Municipal or regional PRPs that include both local impaired waters (Appendix E) and Chesapeake Bay watershed (Appendix D) must address the local impaired waters (i.e., credit cannot be claimed under Appendix E for BMPs implemented outside of the storm sewershed of the local impaired waters).

If the MS4 discharges into multiple local surface waters impaired for nutrients and/or sediment, one PRP may be submitted to satisfy Appendix E but calculations and BMP selections must be completed independently for the storm sewershed of each impaired water. If, for example, an MS4 permittee must complete three PRPs according to the MS4 Requirements Table for three separate surface waters, storm sewershed maps must be developed, existing loads must be calculated, and BMPs must be implemented for pollutant reductions independently within those storm sewersheds. In other words, BMPs cannot be implemented in one storm sewershed to count toward pollutant reductions in an entirely separate storm sewershed for a different impaired water.

Where local surface waters are impaired for nutrients and/or sediment, and those waters are tributary to a larger body of water that is also impaired, MS4s can propose BMPs within the upstream impaired waters to meet the pollutant reduction requirements of both the upstream and downstream waters. For example, if Stream A flows through a municipality that is tributary to Stream B, both are impaired and the MS4 has discharges to both streams, the MS4 can implement BMPs in the storm sewershed of Stream A to satisfy pollutant reduction requirements for both Streams A and B. In general, the MS4 permittee would not be able to satisfy pollutant reduction requirements for both streams if BMPs were only implemented in the storm sewershed of Stream B; however, on a case by case basis DEP will consider such proposals where it can be demonstrated that implementing BMPs in the upstream storm sewershed is infeasible. If, however, Stream A does not flow into Stream B, both are impaired and the MS4 has discharges to both streams, in general DEP would expect that BMPs be implemented in the storm sewershed of both streams to meet pollutant reduction requirements.

F. **Joint PRPs**: MS4s may develop and submit a joint PRP, regardless of whether the MS4s will be submitting a "joint NOI" or are already co-permittees. In general, the MS4s participating in a joint PRP should have contiguous land areas. The "study area" to be mapped is the combined storm sewershed for all MS4 outfalls within all MS4 jurisdictions.

G. **BMP Selection**: MS4s may propose and take credit for only those BMPs that are not required to meet regulatory requirements or otherwise go above and beyond regulatory requirements. For example, a BMP that was installed to meet Chapter 102 NPDES permit requirements for stormwater associated with construction activities may not be used to meet minimum pollutant reductions unless the MS4 can demonstrate that the BMP exceeded regulatory requirements; if this is done, the MS4 may take credit for only those reductions that will occur as a result of exceeding regulatory requirements.

1. **Street Sweeping**: Street sweeping may be proposed as a BMP for pollutant loading reductions if 1) street sweeping is not the only method identified for reducing pollutant loading, and 2) the BMP effectiveness values contained in 3800-PM-BCW0100m are utilized.

Commented [OE6]: This section may require revision based upon the expert panel report which is expected to be approved in the near future.

2. **Sediment Filter Bags**: The installation of sediment filter bags on stormwater inlets may be used for pollutant removal credit; however: 1) only 50% (maximum) of pollutant removal credit can be accounted for through the installation of filter bags, 2) filter bags are generally limited to inlets receiving stormwater flow from a drainage area no greater than 0.5 acre, and 3) the combination of filter bags and street sweeping may not be used to satisfy the full amount of pollutant loading reductions.

II. Required PRP Elements

Each PRP must include the following elements. The paragraph numbers in these instructions correspond to the organization of the PRP. For example, Section A of the PRP must be "Public Participation," Section B must be the map, etc.

A. **Public Participation**. The MS4 shall complete the following public participation measures listed below, and report in the PRP that each was completed.

- The applicant shall make a complete copy of the final/approved PRP available for public review.
- The applicant shall publish, in a newspaper of general circulation in the area, a public notice containing a statement describing the draft plan, where it may be reviewed by the public, and the length of time the permittee will provide for the receipt of comments. The public notice must be published at least 45 days prior to the deadline for submission of the PRP to DEP. **Attach a copy of the public notice to the PRP**.
- The applicant shall accept written comments for a minimum of 30 days from the date of public notice. **Attach a copy of all written comments received from the public to the PRP**.
- The applicant shall accept comments from any interested member of the public at a public meeting or hearing, which may include a regularly scheduled meeting of the governing body of the municipality or municipal authority that is the permittee.
- The applicant shall consider and make a record of the consideration of each timely comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment. **Attach a copy of the permittee's record of consideration of all timely comment received in the public comment period to the PRP**.

For PRPs developed on a regional scale by multiple MS4 permittees or by co-permittees, the collaborating permittees may implement these public participation requirements as a joint effort as long as the notice of the availability of the PRP and the notice of a public meeting or hearing reaches the target audience groups of all permittees involved in the joint effort.

B. **Map**. Attach a map that identifies **land uses and/or impervious/pervious surfaces** and the **storm sewershed boundary** associated with each MS4 outfall that discharges to impaired surface waters, or surface waters draining to the Chesapeake Bay, and calculate the storm sewershed area that is subject to Appendix D and/or Appendix E. In addition, the map must identify the proposed location(s) of structural BMP(s) that will be implemented to achieve the required pollutant load reductions.

The map may be the same as that used to satisfy MCM #3 of the PAG-13 General Permit, with the addition of land use and/or impervious/pervious surfaces, storm sewershed boundaries, and locations of proposed BMPs, or may be a different map.

The map must be sufficiently detailed to identify the "planning area" relevant to satisfying the requirements of Appendix D and/or Appendix E, and to demonstrate that BMPs will be located in appropriate storm sewersheds to meet the requirements. For a single MS4, the study area constitutes the combined storm sewersheds of all MS4 outfalls within the permittee's jurisdiction. For MS4s participating in a joint PRP, the study area constitutes the combined sewersheds of all MS4 outfalls within the jurisdictions of all MS4s in the joint effort.

Figure 1 presents an example storm sewershed map developed for a single MS4 applicant's PRP to address two impaired surface waters. Figure 1 is discussed further below.

Figure 1: Example Storm Sewershed Map

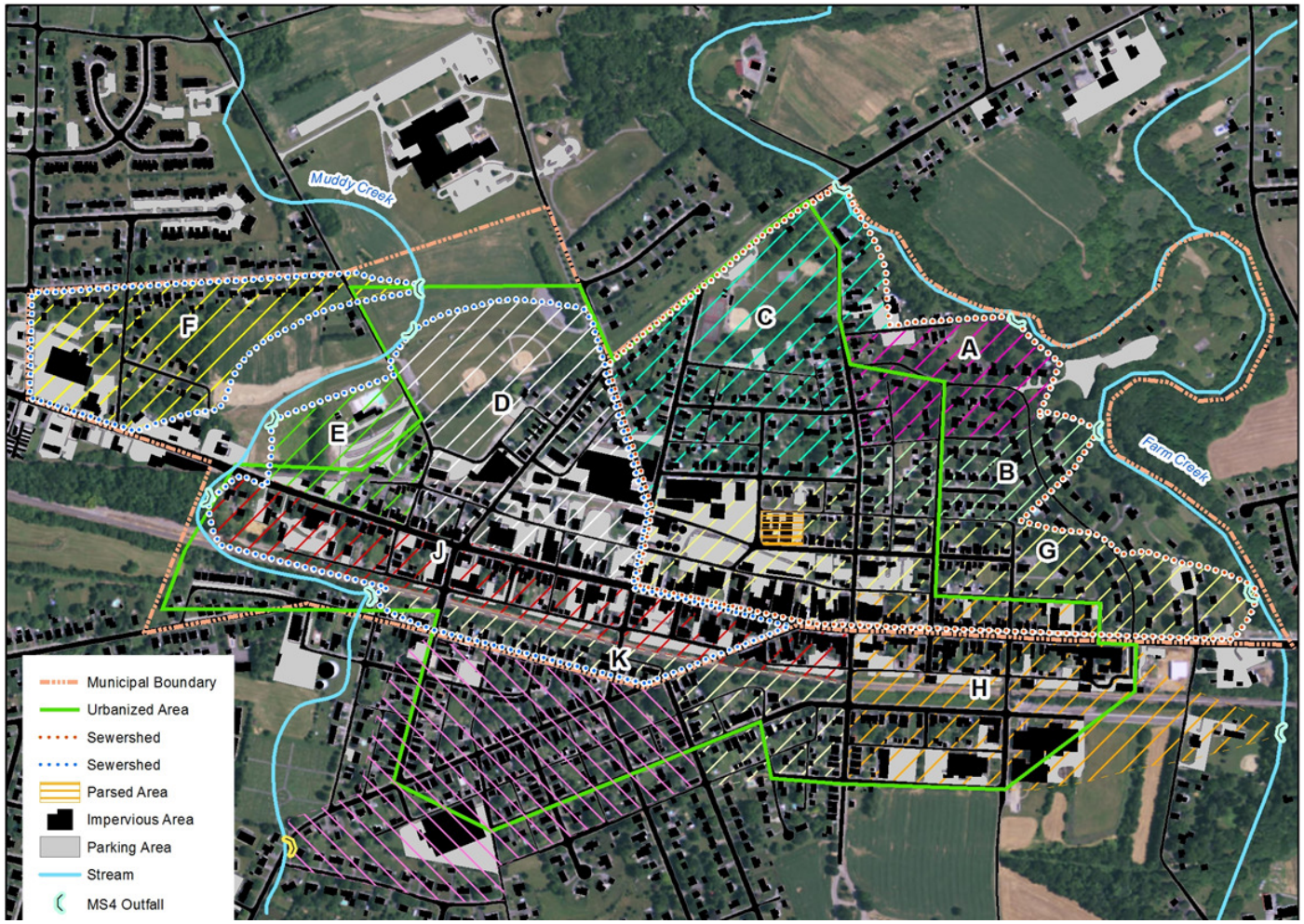

Figure 1 shows an example municipality (whose border is shown with an orange line) and its urbanized area (green border). It also delineates the drainage areas of MS4 outfalls (storm sewersheds), which are labeled as letters. Each storm sewershed is represented by hatched lines of different colors. Storm sewersheds A, B, C, G and H drain to Farm Creek and storm sewersheds D, E, F, J and K drain to Muddy Creek. A red dotted line depicts the combined sewershed ("planning area") for Farm Creek, and a blue dotted line indicates the combined sewershed for Muddy Creek. BMPs selected to address pollutant reductions for Farm Creek and Muddy Creek must be implemented within the red and blue dotted borders, respectively, except that with the Farm Creek storm sewershed one area has been parsed because this site already has NPDES permit coverage for stormwater (see below). Storm sewershed H includes some area within the municipality and urbanized area, although the outfall is located in a different municipality. The portion of storm sewershed H that is within the municipality must be included in the planning area for the Farm Creek PRP. Also, storm sewershed K includes area both inside and outside of the municipality; the portion of storm sewershed K that is within the municipality must be included in the planning area for the Muddy Creek PRP. (Note – this example map does not show the location of selected structural BMPs, but this would be expected for an actual map).

In cases where there are no local impairments but the entire MS4 is located in the Chesapeake Bay drainage area, the map can display the entire storm sewershed within the municipality as a unit, without distinction between discharges to various local surface waters. If, however, there are local surface water impairments, the storm sewersheds for each impaired water must be identified.

The map may show areas that are to be "parsed" from the planning area. In other words, at the MS4's discretion (subject to DEP rules), certain areas may be shown on the map that are within the storm sewershed but are not included in the calculation of land area and existing pollutant loading. Guidance on parsing is contained in **Attachment A**. Note that if parsing is done, BMPs implemented within the parsed area will not count toward achieving pollutant reduction objectives.

C. **Pollutants of Concern**. Identify the pollutants of concern for each storm sewershed (see Section I.B of these instructions).

D. **Determine Existing Loading for Pollutants of Concern**. Identify the date associated with the existing loading estimate (see Section I.C of these instructions). Calculate the existing loading, in lbs per year, for the pollutant(s) of concern in all storm sewersheds.

There are several possible methods to estimate existing loading, ranging from simplistic to very complex. One simple method to estimate existing loading that is ~~acceptable~~preferred ~~to~~by DEP to assist in timely review, but is not required, is to determine the percent impervious and pervious surface within the urbanized area of the storm sewershed and calculate existing loading by multiplying the developed impervious and developed pervious land areas (acres) by pollutant loading rates (lbs/acre/year). Outside of the urbanized area, the MS4 may use loading rates for undeveloped land.

Attachment B presents land loading rates for impervious and pervious surfaces for each county within the Chesapeake Bay watershed, as well as generalized loading rates for counties outside of the Chesapeake Bay watershed.

Attachment C presents an example calculation of existing sediment loading for a Chesapeake Bay PRP using DEP's simplified method. **Attachment D** presents an example calculation of existing sediment loading for an impaired waters PRP, outside of the Chesapeake Bay watershed, using DEP's simplified method.

Use of DEP's simplified method will streamline DEP's review of PRPs, but is not required. Any methodology that calculates existing pollutant loading in terms of lbs per year (where existing is as of March 16, 2013), evaluates BMP-based pollutant reductions utilizing the BMP effectiveness values contained in 3800-PM-BCW0100m, uses average annual precipitation conditions and is based on sound science may be considered acceptable.

If a modeling tool will be used to estimate existing loading, the same tool should be used to estimate future pollutant loading for different BMP implementation scenarios to ensure consistency with input parameters between existing and future loading.

MS4s may, if desired, use data obtained through stormwater sampling to assist in estimating pollutant loading or calibrating models. MS4s considering the use of stormwater sampling to estimate existing loading are encouraged to contact DEP's Bureau of Clean Water during development of a sampling plan to ensure the sampling effort will meet DEP's expectations.

E. **Select BMPs To Achieve the Minimum Required Reductions in Pollutant Loading**. Identify the minimum required reductions in pollutant loading (see Section I.B of these instructions). Applicants must propose the implementation of BMP(s) or land use changes within the storm sewershed that will result in meeting the minimum required reductions in pollutant loading within the storm sewershed(s) identified by the MS4. These BMP(s) must be implemented within 5 years of DEP's approval of coverage under the PAG-13 General Permit, and must be located within the storm sewersheds of the applicable impaired waters, on either public or private property. If the applicant is aware of BMPs that will be implemented by others (either in cooperation with the applicant or otherwise) within the storm sewershed that will result in net pollutant loading reductions (i.e., typically not E&S BMPs to satisfy DEP's Chapter 102 requirements), the applicant may propose those BMPs within its PRP.

MS4s may claim "credit" for structural BMPs implemented between March 16, 2013 and the time of the NOI submission. In order to claim credit, identify all such structural BMPs in Section E of the PRP along with the following information:

- A detailed description of the BMP(s);
- Latitude and longitude coordinates for the BMP(s);
- Location of the BMP(s) on the storm sewershed map;
- The permit number, if any, that authorized installation of the BMP(s);
- Calculations demonstrating the pollutant reductions achieved by the BMP(s) (Note – where the BMP(s) were installed through NPDES permit requirements, the calculations must demonstrate the incremental pollutant reductions resulting from exceeding regulatory requirements); and
- The date the BMP was installed and a statement that the BMP continues to serve the function(s) it was designed for.

The MS4 permittee may optionally submit design drawings of the BMP(s) for previously installed or future BMPs with the PRP.

Historical street sweeping practices should not be considered in calculating credit for future practices. All proposed street sweeping practices may be used for credit if the minimum standard is met for credit (see 3800-PM-BCW0100m). In other words, if sweeping was conducted 1/month and will be increased to 25/year in the future, the MS4 does not need to use the "net reduction" resulting from the increased sweeping; it may take credit for the full amount of reductions from 25/year sweeping.

In the event that DEP issues notification to the MS4 prior to submission of the PRP that pollutant credits may be purchased to achieve or help achieve required pollutant loading reductions, the MS4 may indicate the number of credits that will be purchased annually in the PRP. In the event that DEP issues notification to the MS4 following submission of the PRP that pollutant credits may be purchased, the MS4 may submit a modification to the PRP to DEP in accordance with Appendices D and/or E, as applicable.

Commented [OE7]: Is this a reference to possible trading in the future? If so, please add the language here that EPA recommended in the permit.

The names and descriptions of BMPs and land uses reported in the PRP should be in accordance with the Chesapeake Bay Program Model. The names and descriptions are available through CAST (log in, select "Documentation," select "Source Data" and see worksheets named "Land Use Definitions" and "BMP Definitions").

Commented [OE8]: Will this be part of the training that PADEP will offer in the summer? It would be good to give the permittees an idea of how the program works.

NOTE – In calculating future pollutant loading the applicant must be cognizant of planned changes to land uses or BMPs. For example, if a tract of land (< 1 acre) currently in pasture will be converted within the next few years to residential land use, and there are no ordinances in place ~~controlling~~ to control the rate, volume or quality of stormwater draining from the tract, the potential net increase in pollutant loading must be factored into the future loading estimate; this means that BMPs must be implemented on the tract or elsewhere within the storm sewershed to compensate for this change.

See **Attachments C and D** for examples of selecting BMPs to meet pollutant reduction requirements in Chesapeake Bay PRPs and impaired waters PRPs, respectively.

F. **Identify Funding Mechanism(s)**. Prior to approving coverage DEP will evaluate the feasibility of implementation of an applicant's PRP. Part of this analysis includes a review of the applicant's proposed method(s) by which BMPs will be funded. Applicants must identify all project sponsors and partners and probable funding sources for each BMP. DEP does not expect that guaranteed sources are identified in the PRP, but does expect that applicants propose their preferred funding options with alternatives in the event the preferred options do not materialize.

G. **Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs**. Once implemented the BMPs must be maintained in order to continue producing the expected pollutant reductions. Applicants must identify the following for each selected BMP:

- The party(ies) responsible for ongoing O&M;
- The activities involved with O&M for each BMP; and
- The frequency at which O&M activities will occur.

MS4 permittees will need to identify actual O&M activities in Annual MS4 Status Reports submitted under the General Permit.

III. Submission of PRP

Attach one copy of the PRP with the NOI or individual permit application that is submitted to the regional office of DEP responsible for reviewing the NOI or application. In addition, one copy of the PRP (not the NOI or application) must be submitted to DEP's Bureau of Clean Water (BCW). BCW prefers electronic copies of PRPs, if possible. Email the electronic version of the PRP, including map(s) (if feasible), to RA-EPPAMS4@pa.gov. If the MS4 determines that submission of an electronic copy is not possible, submit a hard copy to: PA Department of Environmental Protection, Bureau of Clean Water, 400 Market Street, PO Box 8774, Harrisburg, PA 17105-8774

ATTACHMENT A

PARSING GUIDELINES FOR MS4s IN POLLUTANT REDUCTION PLANS

DEP has developed these guidelines to assist owners and operators of MS4s that are required to develop Pollutant Reduction Plans (PRPs) in understanding where it is possible to "parse" land area in the course of developing those plans. For the purpose of this document, parsing is defined as a process in which land area is removed from a storm sewershed in order to calculate the actual or target pollutant loads that are applicable to an MS4.

Parsing is not required by NPDES permits and is therefore optional; however, some MS4 permittees may benefit from parsing. When parsing is done, best management practices (BMPs) implemented within the land area that is parsed may not be considered for meeting pollutant loading reductions.

Parsing for PRPs is done differently than parsing for TMDL Plans. For PRPs, MS4s must identify the target pollutant loadings (i.e., existing pollutant loading minus loading reduced by the implementation of BMPs to meet minimum percent reductions in the permit). In order to estimate existing pollutant loading, MS4s may parse out appropriate land area. For TMDL Plans, the target pollutant loadings in the form of wasteload allocations (WLAs) are assigned to an MS4 (or municipality or group of municipalities). The objective of parsing for TMDL Plans is to determine the portion of the WLA that is applicable to the MS4. Parsing for TMDL Plans is not the focus of this attachment.

All parsing must be supported by a map and a determination of the area being parsed and/or appropriate calculations demonstrating how the parsing was done.

Parsing for PRPs

Parsing provides an opportunity for an MS4 permittee to eliminate areas within the storm sewershed that do not drain to the MS4 and areas that are already covered by an NPDES permit (i.e., not a waiver or no exposure certification) for the control of stormwater. For example, the land area of an industrial site that is covered by the PAG-03 General Permit for Stormwater Associated with Industrial Activity that discharges stormwater to the MS4 may be parsed out of the assessment of land area within the storm sewershed that is subject to the calculation of existing pollutant loading. If, however, the industrial land area is removed, BMPs implemented on that land may not be used as credit toward meeting the MS4's pollutant loading reduction requirements. Other examples of land area that may be parsed include:

- The land area associated with a non-municipal MS4 with NPDES permit coverage that exists within the urbanized area of a municipality (in such cases DEP would encourage both entities to submit a combined PRP);
- Land area associated with PennDOT roadways and the Pennsylvania Turnpike (roads and right of ways);
- Lands associated with the production area of a Concentrated Animal Feeding Operation that is covered by an NPDES permit;
- Land areas in which stormwater runoff does not enter the MS4. If an accurate storm sewershed map is developed, these lands may be parsed or excluded as part of that process.

If parsing is initially done for the PRP but the MS4 permittee decides later that it would be in their best interests to include that land in the PRP, the permittee may submit a modified PRP to DEP, following the public participation requirements of Appendices D and E.

Commented [OE9]: Are these MS4 permits going to also include TMDL/PRP requirements when they are reissued?

ATTACHMENT B

DEVELOPED LAND LOADING RATES FOR PA COUNTIES[1,2,3]

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
Adams	impervious developed	10,373.2	33.43	2.1	1,398.77
	pervious developed	44,028.6	22.99	0.8	207.67
Bedford	impervious developed	9,815.2	19.42	1.9	2,034.34
	pervious developed	19,425	17.97	0.68	301.22
Berks	impervious developed	1,292.4	36.81	2.26	1,925.79
	pervious developed	5,178.8	34.02	0.98	264.29
Blair	impervious developed	3,587.9	20.88	1.73	1,813.55
	pervious developed	9,177.5	18.9	0.62	267.34
Bradford	impervious developed	10,423	14.82	2.37	1,880.87
	pervious developed	23,709.7	13.05	0.85	272.25
Cambria	impervious developed	3,237.9	20.91	2.9	2,155.29
	pervious developed	8,455.4	19.86	1.12	325.3
Cameron	impervious developed	1,743.2	18.46	2.98	2,574.49
	pervious developed	1,334.5	19.41	1.21	379.36
Carbon	impervious developed	25.1	28.61	3.97	2,177.04
	pervious developed	54.2	30.37	2.04	323.36
Centre	impervious developed	7,828.2	19.21	2.32	1,771.63
	pervious developed	15,037.1	18.52	0.61	215.84
Chester	impervious developed	1,838.4	21.15	1.46	1,504.78
	pervious developed	10,439.8	14.09	0.36	185.12
Clearfield	impervious developed	9,638.5	17.54	2.78	1,902.9
	pervious developed	17,444.3	18.89	1.05	266.62
Clinton	impervious developed	7,238.5	18.02	2.80	1,856.91
	pervious developed	11,153.8	16.88	0.92	275.81
Columbia	impervious developed	7,343.1	21.21	3.08	1,929.18
	pervious developed	21,848.2	22.15	1.22	280.39
Cumberland	impervious developed	8,774.8	28.93	1.11	2,065.1
	pervious developed	26,908.6	23.29	0.34	306.95
Dauphin	impervious developed	3,482.4	28.59	1.07	1,999.14
	pervious developed	9,405.8	21.24	0.34	299.62
Elks	impervious developed	1,317.7	18.91	2.91	1,556.93
	pervious developed	1,250.1	19.32	1.19	239.85
Franklin	impervious developed	13,832.3	31.6	2.72	1,944.85
	pervious developed	49,908.6	24.37	0.76	308.31
Fulton	impervious developed	3,712.9	22.28	2.41	1,586.75
	pervious developed	4,462.3	18.75	0.91	236.54
Huntington	impervious developed	7,321.9	18.58	1.63	1,647.53
	pervious developed	11,375.4	17.8	0.61	260.15
Indiana	impervious developed	589	19.29	2.79	1,621.25
	pervious developed	972	20.1	1.16	220.68
Jefferson	impervious developed	21.4	18.07	2.76	1,369.63
	pervious developed	20.4	19.96	1.24	198.60
Juniata	impervious developed	3,770.2	22.58	1.69	1,903.96
	pervious developed	8,928.3	17.84	0.55	260.68
Lackawana	impervious developed	2,969.7	19.89	2.84	1,305.05
	pervious developed	7,783.9	17.51	0.76	132.98
Lancaster	impervious developed	4,918.7	38.53	1.55	1,480.43
	pervious developed	21,649.7	22.24	0.36	190.93
Lebanon	impervious developed	1,192.1	40.58	1.85	1,948.53
	pervious developed	5,150	27.11	0.4	269.81
Luzerne	impervious developed	5,857	20.43	3	1,648.22
	pervious developed	13,482.9	19.46	0.98	221.19
Lycoming	impervious developed	10,031.7	16.48	2.57	1,989.64
	pervious developed	19,995.5	16	0.84	277.38
McKean	impervious developed	38.7	20.93	3.21	1,843.27

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
	pervious developed	5.3	22.58	1.45	249.26
Mifflin	impervious developed	5,560.2	21.83	1.79	1,979.13
	pervious developed	16,405.5	21.13	0.71	296.07
Montour	impervious developed	5,560.2	21.83	1.79	1,979.13
	pervious developed	16,405.5	21.13	0.71	296.07
Northumberland	impervious developed	8,687.3	25.73	1.54	2,197.08
	pervious developed	25,168.3	24.63	0.54	367.84
Perry	impervious developed	5,041.1	26.77	1.32	2,314.7
	pervious developed	9,977	23.94	0.51	343.16
Potter	impervious developed	2,936.3	16.95	2.75	1,728.34
	pervious developed	2,699.3	17.11	1.09	265.2
Schuylkill	impervious developed	5,638.7	30.49	1.56	1,921.08
	pervious developed	14,797.2	29.41	0.57	264.04
Snyder	impervious developed	4,934.2	28.6	1.11	2,068.16
	pervious developed	14,718.1	24.35	0.4	301.5
Somerset	impervious developed	1,013.6	25.13	2.79	1,845.7
	pervious developed	851.2	25.71	1.14	293.42
Sullivan	impervious developed	3,031.7	19.08	2.85	2,013.9
	pervious developed	3,943.4	21.55	1.31	301.58
Susquehanna	impervious developed	7,042.1	19.29	2.86	1,405.73
	pervious developed	14,749.7	20.77	1.21	203.85
Tioga	impervious developed	7,966.9	12.37	2.09	1,767.75
	pervious developed	18,090.3	12.22	0.76	261.94
Union	impervious developed	4,382.6	22.98	2.04	2,393.55
	pervious developed	14,065.3	20.88	0.69	343.81
Wayne	impervious developed	320.5	18.69	2.89	1,002.58
	pervious developed	509	21.14	1.31	158.48
Wyoming	impervious developed	3,634.4	16.03	2.53	2,022.32
	pervious developed	10,792.9	13.75	0.7	238.26
York	impervious developed	10,330.7	29.69	1.18	1,614.15
	pervious developed	40,374.8	18.73	0.29	220.4
All Other Counties	impervious developed	-	23.06	2.28	1,839
	pervious developed	-	20.72	0.84	264.96

Notes:

1 These land loading rate values may be used to derive existing pollutant loading estimates under DEP's simplified method for PRP development. MS4s may choose to develop estimates using other scientifically sound methods.

2 Acres and land loading rate values for named counties in the Chesapeake Bay watershed are derived from CAST. (The column for Acres represents acres within the Chesapeake Bay watershed). For MS4s located outside of the Chesapeake Bay watershed, the land loading rates for "All Other Counties" may be used to develop PRPs under Appendix E; these values are average values across the Chesapeake Bay watershed.

3 For land area outside of the urbanized area, undeveloped land loading rates may be used where appropriate. When using the simplified method, DEP recommends the following loading rates (for any county) for undeveloped land:

- TN – 10 lbs/acre/yr
- TP – 0.33 lbs/acre/yr
- TSS (Sediment) – 234.6 lbs/acre/yr

These values were derived by using the existing loads for each pollutant, according to the 2014 Chesapeake Bay Progress Run, and dividing by the number of acres for the unregulated stormwater subsector.

ATTACHMENT C

CHESAPEAKE BAY PRP EXAMPLE USING DEP SIMPLIFIED METHOD

This example illustrates how Sections D and E of a Chesapeake Bay PRP may be developed using DEP's simplified method. A "model PRP" document will be developed and posted to DEP's website, www.dep.pa.gov/MS4, which will include greater detail and address all required components of a PRP.

Section D. Determine Existing Loading for Pollutants of Concern.

ABC City in Dauphin County, PA has a total of 1,000 acres in its storm sewershed for surface waters draining to the Chesapeake Bay, 40% (400 acres) of which are impervious, 40% (400 acres) of which are pervious and 20% (200 acres) of which are undeveloped. The City must prepare a PRP for Chesapeake Bay waters and must follow Appendix D in the PAG-13 General Permit.

The date of this existing loading determination is September 16, 2017 (date of NOI submission). No eligible structural BMPs were installed during the period March 16, 2013 to the date of NOI submission.

According to Attachment B of the PRP Instructions, Dauphin County's developed and undeveloped land loading rates for sediment are as follows:

Category	Sediment Loading Rate (lbs/acre/yr)
Impervious developed	1,999.14
Pervious developed	299.62
Undeveloped	234.6

The existing loading using DEP's simplified method is calculated as follows:

(400 acres x 1,999.14 lbs/acre/yr) + (400 acres x 299.62 lbs/acre/yr) + (200 acres x 234.6 lbs/acre/yr)
= 964,424 lbs/yr

Section E. Select BMPs To Achieve the Minimum Required Reductions in Pollutant Loading.

The City needs to determine the minimum sediment loading (lbs/yr) that must be reduced within 5 years following DEP's approval of coverage. The minimum percent reduction according to Appendix D is 10%.

Minimum Sediment Reduction Required = 964,424 lbs/yr existing loading x 0.1 (10%) = 96,442 lbs/yr sediment

The following describes the analysis of BMPs undertaken by ABC City to reduce 96,442 lbs/yr of sediment.

BMP Option 1. The City currently conducts street sweeping at a frequency of 1/month. The City's engineer proposes to increase street sweeping to 25 times per year (or approximately 2/month, the minimum necessary to obtain credit in the Chesapeake Bay Model). The BMP effectiveness value for street sweeping 25 times per year (the same street) is 9% for sediment (see 3800-PM-BCW0100m). Of the 400 acres that are impervious in the storm sewershed, 100 acres represent City streets that will be swept at the increased frequency. The following sediment loading reduction from increased street sweeping is estimated (values are rounded):

Estimated Sediment Reduction = 100 acres x 1,999.14 lbs/acre/yr x 0.09 (9%) = 17,992 lbs/yr

The minimum sediment loading reduction of 96,442 lbs/yr is not satisfied by increased street sweeping. (Even if satisfied, street sweeping may not be the only BMP proposed in a PRP). Additional BMPs are needed.

BMP Option 2. The City examines the BMP effectiveness values and notices that permeable pavement results in relatively high pollutant reductions. The City has applied for a grant to modify three municipally-owned parking lots (a

total of 3 acres) to permeable pavement, and believes the work could be completed within 5 years of PAG-13 General Permit coverage approval. The sediment BMP effectiveness value for permeable pavement is 85% for A or B soil without an underdrain.

Estimated reductions use the BMP effectiveness value above multiplied by the BMP acres and the impervious surface loading rates:

Estimated Sediment Reduction = 3 acres x 1,999.14 lbs/acre/yr x 0.85 (85%) = 5,098 lbs/yr

The minimum sediment loading reduction of 96,442 lbs/yr has not been met; a balance of 73,352 lbs/yr remains (96,442 lbs/yr – 17,992 lbs/yr – 5,098 lbs/yr). Additional or alternative BMPs are needed.

BMP Option 3. The City has been approached by the local girl scouts who are seeking a project relating to stormwater management. The City's engineer looks at a map and the BMP effectiveness values and suggests that a bioswale could be installed in the City's park, which sits adjacent to a stream and receives drainage from 5 acres of pervious developed land and 2 acres of impervious developed land. Stormwater currently flows through a 24-inch pipe but could be removed for this project. The bioswale would replace 100 feet of pipe receiving drainage from 7 acres. The sediment BMP effectiveness values for a bioswale is 80%.

Estimated Sediment Reduction, Impervious = 2 acres x 1,999.14 lbs/acre/yr x 0.8 (80%) = 3,199 lbs/yr
Estimated Sediment Reduction, Pervious = 5 acres x 299.62 lbs/acre/yr x 0.8 (80%) = 1,198 lbs/yr

The total sediment reduction would be 4,397 lbs/yr, leaving a balance of 68,955 lbs/yr for sediment. Additional or alternative BMPs are needed.

BMP Option 4. The City is considering "Urban Stream Restoration" through cooperation with a watershed group. A total of 1,000 linear feet of stream banks will be restored. The sediment BMP effectiveness value is 44 lbs/ft.

Upon completion of the project, the following sediment loading reduction is anticipated:

Estimated Sediment Reduction = 1,000 ft x 44.88 lbs/ft = 44,880 lbs/yr

The restoration of 1,000 linear feet of stream banks will not satisfy the minimum required sediment reduction, leaving a balance of 24,075 lbs/yr. Additional or alternative BMPs are needed.

BMP Option 5. During heavy rains stormwater promotes flooding on a PennDOT roadway. The pipe used to convey stormwater is too small to handle design storm events. The proposed solution was replacement with a larger pipe; however, the City's engineer determines that an infiltration basin could be sized properly upstream of the pipe to accommodate average annual stormwater flow conditions and help reduce flooding during severe weather. The best location for this basin is on privately-owned property that is undeveloped (outside of the urbanized area). The City proposes to acquire a right-of-way to install the basin, which will treat runoff from 34 acres of undeveloped land, and apply for a PENNVEST loan to pay for it. The sediment BMP effectiveness value is determined to be 95%.

Upon completion of the project, the following sediment loading reduction is anticipated:

Estimated Sediment Reduction = 34 acres x 234.6 lbs/acre/yr x 0.95 (95%) = 7,578 lbs/yr

The installation of an infiltration basin will not satisfy the minimum required sediment reduction, leaving a balance of 16,497 lbs/yr. Additional or alternative BMPs are needed.

BMP Option 6. The City is evaluating the possibility of installing sediment filter bags on some of its stormwater inlets. The sediment BMP effectiveness for filter bags is 80%. The City has 150 stormwater inlets, and 100 have drainage areas of 0.5 acre or less. The City proposes to purchase and maintain 100 filter bags that receive drainage from 40 acres of impervious developed land.

Upon completing the installation of filter bags, the following sediment loading reduction is anticipated:

Estimated Sediment Reduction = 40 acres x 1,999.14 lbs/acre/yr x 0.8 (80%) = 63,972 lbs/yr

The installation of sediment filter bags will satisfy 66% of the City's sediment pollutant loading reduction requirement. The maximum amount that an MS4 can take credit for using filter bags is 50%. The City decides to reduce the number of filter bags to 80, which will filter runoff from 30 acres. The estimated sediment reduction is: 30 acres x 1,999.14 lbs/acre/yr x 0.8 = 47,979 lbs/yr, which is approximately half of the City's reduction requirement.

Summary of Alternatives and Selection of BMPs

The City evaluates its BMP alternatives and selects Option 4, Urban Stream Restoration, because it believes the watershed group will receive a grant from DEP to cover most of the costs and because of the significant pollutant reductions the project offers. The City also selects Option 6 because of the significant reductions that can be realized through filter bags, with proper maintenance. These two projects do not satisfy the full reduction needed, so at least one more must be selected. The City decides to pursue Option 5, infiltration, as it may help reduce a roadway flooding issue. The City decides not to increase street sweeping frequency, but will maintain its existing frequency because of the possibility of receiving additional credit in the future.

In summary, the City in this example will commit to implementing the following BMPs in its PRP to meet the 10% sediment loading reduction requirement for the PAG-13 General Permit:

Selected BMP	Estimated Sediment Loading Reduction (lbs/yr)
Urban Stream Restoration	44,880
Infiltration Basin	7,578
Sediment Filter Bags on 80 Inlets	47,979
Total:	100,437 ✓
Minimum Required:	96,442

ATTACHMENT D

IMPAIRED WATERS PRP EXAMPLE USING DEP SIMPLIFIED METHOD

This example illustrates how Sections D and E of an impaired waters PRP may be developed using DEP's simplified method.

Section D. Determine Existing Loading for Pollutants of Concern.

XYZ Township in Allegheny County, PA has a total of 2,000 acres in a storm sewershed that drains to a surface water that is impaired for siltation and nutrients. The MS4 Requirements Table specifies that a PRP for impaired waters (Appendix E) must be developed. In this storm sewershed, 30% (600 acres) is impervious developed land and 70% (1,400 acres) is pervious developed land.

The date of this existing loading determination is March 16, 2013. One eligible structural BMP was installed during the period March 16, 2013 to the date of NOI submission.

According to Attachment B of the PRP Instructions, Allegheny County's (outside of the Chesapeake Bay watershed) developed land loading rates for sediment are as follows:

Category	Sediment Loading Rate (lbs/acre/yr)	TP Loading Rate (lbs/acre/yr)
Impervious developed	1,839	2.28
Pervious developed	264.96	0.84

The existing loading using DEP's simplified method is calculated as follows:

Existing Sediment Loading: (600 acres x 1,839 lbs/acre/yr) + (1,400 acres x 264.96 lbs/acre/yr) = 1,474,344 lbs/yr
Existing TP Loading: (600 acres x 2.28 lbs/acre/yr) + (1,400 acres x 0.84 lbs/acre/yr) = 2,544 lbs/yr

Section E. Select BMPs To Achieve the Minimum Required Reductions in Pollutant Loading.

The Township needs to determine the minimum sediment and Total Phosphorus (TP) loading (lbs/yr) that must be reduced within 5 years following DEP's approval of coverage. The minimum percent reduction according to Appendix E is 10% for sediment and 5% for TP.

Minimum Sediment Reduction Required = 964,424 lbs/yr existing loading x 0.1 (10%) = 147,434 lbs/yr sediment
Minimum TP Reduction Required = 2,544 lbs/yr existing loading x 0.05 (5%) = 127 lbs/yr TP

The following describes the analysis of BMPs undertaken by XYZ Township to reduce sediment and TP loads.

BMP Option 1. The City currently conducts street sweeping at a frequency of once every three months. The City's engineer proposes to increase street sweeping to 25 times per year. The BMP effectiveness value for street sweeping 25 times per year (the same street) is 9% for sediment and 3% for TP (see 3800-PM-BCW0100m). Of the 600 acres that are impervious in the storm sewershed, 150 acres represent City streets that will be swept at the increased frequency. The following sediment loading reduction from increased street sweeping is estimated (values are rounded):

Estimated Sediment Reduction = 150 acres x 1,839 lbs/acre/yr x 0.09 (9%) = 24,827 lbs/yr
Estimated TP Reduction = 150 acres x 2.28 lbs/acre/yr x 0.03 (3%) = 10 lbs/yr

The minimum sediment and TP loading reductions are not satisfied by increased street sweeping. (Even if satisfied, street sweeping may not be the only BMP proposed in a PRP). Additional BMPs are needed.

BMP Option 2. The Township has been planning to establish an authority and begin charging a fee based on the area of impervious surface associated with parcels. The fee can be offset through the installation of BMPs that

reduce the rate and volume of stormwater runoff. The Township is aware of a large industrial operation within the storm sewershed that is planning to construct to remove vacant parking lots and install a series of infiltration galleries to treat runoff from approximately half of its complex, or about 50 acres. The BMP effectiveness values for TP and sediment are 85% and 95%, respectively. Of the 50 acres to be treated, 45 are impervious and 5 are pervious.

Estimated Sediment Reduction, Impervious = 45 acres x 1,839 lbs/acre/yr x 0.95 (95%) = 78,617 lbs/yr
Estimated Sediment Reduction, Pervious = 5 acres x 264.96 lbs/acre/yr x 0.95 (95%) = 1,259 lbs/yr

Estimated TP Reduction, Impervious = 45 acres x 2.28 lbs/acre/yr x 0.85 (85%) = 87 lbs/yr
Estimated TP Reduction, Pervious = 5 acres x 0.84 lbs/acre/yr x 0.85 (85%) = 4 lbs/yr

The minimum sediment loading reduction of 147,434 lbs/yr has not been met; a balance of 42,731 lbs/yr remains (147,434 lbs/yr – 24,827 lbs/yr – 78,617 lbs/yr). Additional or alternative BMPs are needed.

The minimum TP loading reduction of 127 lbs/yr has not been met; a balance of 26 lbs/yr remains (127 lbs/yr – 10 lbs/yr – 87 lbs/yr – 4 lbs/yr). Additional or alternative BMPs are needed.

BMP Option 3. The Township has a park with a lake used for recreation, which is owned and operated by the county. The lake is manmade and receives inflow from a small stream. This stream receives stormwater discharges from 10 MS4 outfalls prior to flowing into the lake, draining an area of 75 acres, 25 of which are in the Township (all of which are impervious). The Township is aware that the lake is nearly full of sediment, and is considering dredging the lake. The Township learned that dredging sediment will not count toward meeting pollutant reduction goals, but is still interested in dredging for future recreational use. It is also cognizant that the same problem could recur unless steps are taken upstream to reduce stormwater flows. The Township engineer proposes to reroute stormwater piping to bypass the small stream into a belowground mixed media filtration system, immediately upstream from the lake, which will provide some infiltration but will also capture sediment. The upstream end of the lake will be dredged to make room for the filtration system, and the outflow from this BMP would discharge to the lake. Both the Township and County agree in principal to the proposal, and believe grant funds can be secured for the work.

Estimated Sediment Reduction = 25 acres x 1,839 lbs/acre/yr x 0.95 (95%) = 43,676 lbs/yr

Estimated TP Reduction = 25 acres x 2.28 lbs/acre/yr x 0.85 (85%) = 48 lbs/yr

NOTE – If the neighboring municipality was an MS4 permittee and the permittees collaborated on the PRP, credit for an additional 50 acres could have been taken.

With the selection of this BMP, the sediment and TP loading reduction requirements will be met.

Summary of Alternatives and Selection of BMPs

The Township wishes to pursue all three BMPs it has evaluated. These BMPs will meet the objectives of 10% and 5% loading reductions for sediment and TP, respectively:

Selected BMP	Estimated Sediment Loading Reduction (lbs/yr)	Estimated TP Loading Reduction (lbs/yr)
Street Sweeping 25/Year	24,827	10
Infiltration Practices (Industrial)	79,876	91
Infiltration Practices (County Park)	43,676	48
Total:	148,379 ✓	149 ✓
Minimum Required:	147,434	127